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Part VIII

Environmental Protection Agency

Pressure Sensitive Tape and Label Surface Coating Operations; Standards of Performance for New Stationary Sources; Public Hearing and Proposed Rulemaking

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[AD-FRC 1533-8]

Standards of Performance for New Stationary Sources; Pressure Sensitive Tape and Label Surface Coating Operations

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed Rule and Notice of Public Hearing.

SUMMARY: Standards of performance are proposed to limit the emission of volatile organic compounds (VOC) from new, modified, or reconstructed pressure sensitive tape and label (PSTL) manufacturing facilities. Emissions would be limited to 0.20 kilograms of VOC per kilogram of coating solids applied for each affected coating line as measured by Reference Methods 24 and 25 (promulgated in the **Federal Register** on October 3, 1980 45 FR 65956). As an alternative, the owner or operator may demonstrate either a 90 percent overall VOC emission reduction or an overall percent emission reduction which is equivalent to the 0.20 kilograms per kilogram of coating solids applied level, whichever is less stringent. This overall reduction is based on the amount of solvent applied with the coating solids.

The proposed standards implement Section 111 of the Clean Air Act and are based on the Administrator's determination that industrial paper coating facilities contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare. Pressure sensitive tape and label manufacturing is one of the largest contributors to air pollution in the industrial paper coating category. The intended effect of this proposal is to require new, modified, and reconstructed pressure sensitive tape or lable manufacturing facilities to use the best demonstrated system of continuous emission reduction, considering costs, nonair quality health, and environmental and energy impacts.

A public hearing will be held to provide interested persons an opportunity for oral presentation of data, views, or arguments concerning the proposed standards.

DATES: *Comments.* Comments must be received on or before March 2, 1981.

Public Hearing. A public hearing will be held on January 30, 1981 (about 30 days after proposal) beginning at 9 a.m.

Request to Speak at Hearing. Persons wishing to present oral testimony should contact EPA by January 23, 1981.

ADDRESSES: *Comments.* Comments should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket Number A-79-38, U.S. Environmental Protection Agency, 401 M Street SW., Washington, D.C. 20460.

Public Hearing. The public hearing will be held at OA Auditorium EPA, R.T.P. North Carolina. Persons wishing to present oral testimony should notify Mrs. Naomi Durkee, Standards Development Branch (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5331.

Background Information Document. The Background Information Document (BID) for the proposed standards may be obtained from the U.S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone number (919) 541-2777. Please refer to "Pressure Sensitive Tape and Label Surface Coating Industry, Background Information Document for Proposed Standards, "EPA-450/3-80-003a.

Docket. Docket Number A-79-38, containing supporting information used in developing the proposed standards, is available for public inspection and copying between 8 a.m. and 4 p.m., Monday through Friday, at EPA's Central Docket Section, Room 2902, Waterside Mall, 401 M Street SW., Washington, D.C. 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Mr. Gene W. Smith, Standards Development Branch, Emission Standards and Engineering Division (M-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5421.

SUPPLEMENTARY INFORMATION:

Proposed Standards

The proposed standards would apply to new, modified, and reconstructed adhesive, release, and precoat coating lines used in the manufacture of PSTL. The emission of VOC would be limited to 0.20 kilograms per kilogram of coating solids applied. As an alternative, the owner or operator may demonstrate either a 90 percent overall VOC emission reduction or an overall percent emission reduction which is equivalent to the 0.20 kilograms per kilogram of coatings solids applied level, whichever is less stringent. Compliance will be determined over a calendar month averaging period by Reference Method 24. Reference Method 25 will be used to performance test coating lines controlled by incineration systems. Coating lines which emit no more than 125 kilograms of VOC per day and 15 megagrams of VOC per year are not subject to the emission limits of the proposed standard. If either the daily or yearly limit is exceeded, the coating line will become subject to the proposed emission limit of 0.20 kg VOC per kg coating solids applied. If the daily or yearly limits are not exceeded an affected facility is only subject to the recordkeeping and reporting requirements of the proposed standard.

The proposed standards are based on an overall VOC emission reduction. The overall reduction is calculated by multiplying the operational efficiency of the control device (carbon adsorbers or incinerators) by the operational efficiency of the vapor capture system (hooding or enclosures). The resultant efficiency is the overall VOC emission reduction achievable by a coating facility.

The proposed standard allows for compliance by using either low-solvent coatings or add-on control equipment. Carbon adsorption and thermal incineration control systems are capable of meeting the proposed standard. Generally, hot melt and waterborne adhesive coatings and 100 percent solid and waterborne release coatings would comply with the proposed standard because they would contain less than 0.20 kilograms of VOC per kilogram of coating solids applied.

Summary of Environmental, Energy, and Economic Impacts

The environmental, energy, and economic impacts of a new source performance standard (NSPS) are expressed as incremental differences between the impacts for facilities complying with the proposed standard and for those complying with a typical State Implementation Plan (SIP) emission standard. Most existing PSTL surface coating operations are located in areas which are considered nonattainment areas for purposes of achieving the National Ambient Air Quality Standard (NAAQS) for ozone. New facilities are expected to locate in similar areas. For the purpose of this analysis it is assumed that states have adopted or will adopt the recommended guidelines in the control techniques guideline (CTG) document, "Control of Volatile Organic Emissions from Existing Stationary Sources—Volume II: Surface Coating of Cans, Coil, Paper, Fabrics, Automobiles and Light-Duty Trucks" (EPA-450/2-77-008 [CTG]). The States, however, are not legally bound to adopt the recommended emission

limits of the CTG document. In this analysis the CTG limits were used as a comparison baseline because they reflect the control level most likely to be instituted in the states' air pollution control regulations (State Implementation Plans).

Compared to emission control levels recommended in the CTG document, the proposed standards of performance would further reduce emissions of VOC from new, modified, or reconstructed pressure sensitive tapes and labels manufacturing operations by about 16 percent in 1985. National emissions of VOC would be reduced by about 4,300 megagrams (metric tons) per year in 1985.

National wastewater discharges would be 13 percent greater than those occurring from plants controlled to the CTG level. National discharges of wastewater would increase in 1985 by about 2.5 million liters (661,000 gallons) as a result of the 13 percent change. This increase is reasonable in light of the nationwide reduction in VOC emissions being achieved.

The solid waste impact of the proposed standards would be small compared to the amount of solid waste generated by the daily production operations of a PSTL coating facility. A coating facility can generate large quantities of solid waste consisting of flawed coated products, imperfect face stock, substandard release paper, empty cartons, and spools. The only additional solid waste from a controlled facility is spent activated carbon from carbon adsorption units. In 1985 the maximum expected increase in national solid waste as a direct result of the NSPS would be about 55 megagrams (metric tons). The proposed standard is reasonable despite this solid waste increase.

The national energy impact would be dependent on whether the majority of new solvent-based coating lines used incineration, carbon adsorption, or low-solvent coatings for VOC control purposes. Because the Agency is unable to predict with certainty the fraction of new facilities which will use each of these technologies, this analysis is performed on the two technologies—carbon adsorption and incineration—which would result in the extreme impacts. The best case energy situation would result if all lines used carbon adsorption. If, in 1985, all solvent-based lines used carbon adsorption controls, a potential net national energy savings equivalent to 27,100 barrels (4.3 million liters) of crude oil per year is projected. A savings is possible because of the large credit received for usable recovered solvent. The worst case energy situation would occur if all solvent-based coating lines used incinerators to control VOC emissions. All solvent would be destructed and no recovery value could be obtained. A potential national energy demand of 31,000 barrels (4.9 million liters) of crude oil for VOC control is estimated. The proposed standard is reasonable even taking into account the worst case energy estimate.

The proposed standards would have minimal economic impact on the PSTL industry. The maximum expected price increase necessary to offset the impact of the proposed standards would be 0.9 percent. Nationwide in 1985, the anticipated incremental annualized cost of compliance, including depreciation and interest, would be $2.6 million. Effects on growth, industry structure, and profitability would not cause significant inflationary impacts or market withdrawals.

In addition to emission reductions beyond those achieved by a typical SIP, standards of performance have other benefits. They establish a degree of national uniformity to avoid situations in which some States may attract industries by relaxing air pollution standards relative to other States. Further, standards of performance improve the efficiency of case-by-case determinations of best available control technology (BACT) for facilities located in attainment areas, and lowest achievable emission rates (LAER) for facilities located in nonattainment areas, by providing a starting point for these determinations. This results from the process for developing a standard of performance, which involves a comprehensive analysis of regulatory alternatives. Detailed cost and economic analyses of various regulatory alternatives are presented in the supporting documents for the proposed standards.

Rationale

Selection of Source

The "Priority List and Additions to the List of Categories of Stationary Sources for New Source Performance Standards under the Clean Air Act Amendments of 1977", promulgated at 44 FR 49222 on August 21, 1979, ranked sources according to the impact that the standards promulgated in 1980 would have on emissions and public health in 1990. The paper coating industry ranked fourth on this list of 59 sources to be controlled for air pollutants. The manufacture of pressure sensitive tapes and labels is the largest organic solvent-using segment of the paper coating industry.

Approximately 80 percent of all pressure sensitive tapes and labels are coated with organic solvent-based coatings. All but a very small percentage of this solvent is emitted during the manufacturing process. The pressure sensitive tape and label surface coating source consists of any rollcoating operation which applies pressure sensitive adhesives, release coatings or precoats on a continuous web material. Decals and adhesive specialty products are included in the definition of pressure sensitive tapes and labels because plant visits and industry literature showed that the manufacturing operations and coating formulations for all of these products are similar.

In 1978 nationwide emissions of VOC from the pressure sensitive tape and label industry were estimated at 600,000 megagrams (metric tons). This estimate was based on PSTL industry production data and typical formulation data. Very few of these emissions were controlled by State regulations.

Selection of Pollutants and Affected Facilities

VOC are the primary air pollutants emitted from pressure sensitive tape and label surface coating operations. VOC along with nitrogen oxides are precursors to the formation of ozone and oxygenated organic aerosols (photochemical smog). Ozone and oxygenated organic aerosols result in a variety of adverse impacts on health and welfare, including impaired respiratory function, eye irritation, deterioration of materials such as rubber, and necrosis of plant tissue. Further information on these effects can be found in the April 1978 EPA document "Air Quality Criteria for Ozone and Other Photochemical Oxidants", EPA–600/8–78–004. This document can be obtained from the EPA Library (MD–35), Research Triangle Park, North Carolina 27711, telephone number (919) 541–2777.

Solvent drying ovens are potentially a source of pollutants other than VOC (for example NO_x, SO_2, and particulates). The drying ovens are operated with electricity, indirect heat sources, or direct-fired burners. The electrical ovens do not add to the pollutants expected at the source. The indirect-heated ovens are usually steam-tube heaters with an on-site steam boiler. Control of the boiler emissions is being examined by EPA in a separate strdy of industrial boilers.

Generally, natural gas or liquid petroleum gas is used in the direct-fired heaters. Coal and fuel oil are not used because fly ash material in the oven gases can adversely affect the expected

tape or label quality. The SO_2 emissions rate from the combustion of natural gas is very low. Also, the relatively low temperature environments in the direct-fired burners would result in low NO_x emissions.

Based on their overall volume magnitude and their severity as an air pollutant problem, VOC emissions would be the only pollutants regulated by this standard.

For the purposes of this standard, a single coating line, consisting primarily of an adhesive, release, or precoating head, a drying/curing oven, and the flashoff area between the coating head and oven, if defined as the affected facility. For systems which have tandem coating facilities, each individual coating line would be considered as an affected facility. A tandem coating facility is one which coats releases and adhesives in series on one line.

The choice of the affected facility for this standard is based on the Agency's interpretation of Section 111 of the Act, and judicial construction of its meaning.* Under Section 111, the NSPS must apply to "new sources"; "source" is defined as "any building, structure, facility, or installation which emits or may emit any air pollutant" (Section 111(a)(3)). Most industrial plants, however, consist of numerous pieces or groups of equipment which emit air pollutants, and which might be viewed as "sources." EPA therefore uses the term "affected facility" to designate the equipment, within a particular kind of plant, which is chosen as the "source" covered by a given standard.

In choosing the affected facility, EPA must decide which pieces or groups of equipment are the appropriate units for separate emission standards in the particular industrial context involved. The Agency must do this by examining the situation in light of the terms and purpose of Section 111. One major consideration in this examination is that the use of a narrower definition results in bringing replacement equipment under the NSPS sooner; if, for example, an entire plant were designated as the affected facility, no part of the plant would be covered by the standard unless the plant as a whole is "modified." If, on the other hand, each piece of equipment is designated as the affected facility, then as each piece is replaced, the replacement piece will be a new source subject to the standard. Since the purpose of Section 111 is to minimize emissions by the application of the best demonstrated control technology (considering cost, other health and environmental effects, and energy requirements) at all new and modified sources, there is a presumption that a narrower designation of the affected facility if proper. This ensures that new emission sources within plants will be brought under the coverage of the standards as they are installed. This presumption can be overcome, however, if the Agency concludes that the relevant statutory factors (technical feasibility, cost, energy, and other environmental impacts) point to a broader definition. The application of these factors is discussed below.

Designation of the entire coating operation from unwind to rewind as an affected facility was also considered. Such a designation would allow those sources that achieve highly effective control on some coating sections (of a single coating line) to provide less control on other sections, so long as the aggregate emissions from the coating line are less than or equal to those allowed under the proposed standard. The proponents of a broader designation of affected facility (as the operation from unwind to rewind) believe it would provide additional incentive to industry for the innovative use of low-solvent technology in processes where it is not currently available.

Based on currently available information, EPA believes that the cost and energy savings already associated with using low solvent technology are so great that any additional incentive derived through the use of the broader designation of affected facility will have little or no impact on the rate of innovation. If this is true, the proposed designation of affected facility would give more total emission reduction than the alternative broader designation because the low-solvent materials would be used regardless and the other sections of the coating line would still have to be fully controlled with a capture system and a control device.

In order to promulgate the broader designation, EPA would have to find that it would achieve greater total emission reductions or equivalent total reductions with significant other benefits such as reduced costs, energy consumption or other environmental impacts. EPA solicits comments on this issue.

Persons urging consideration of the alternative broader designation should specifically address the issue of how much additional incentive (or disincentive) the designation of affected facility is likely to provide for an owner or operator's decision to use low-solvent coatings. Where possible the comments should present an economic and environmental analysis to support the position taken.

New coating lines which do not discharge into the atmosphere more than 125 kilograms of VOC per day or 15 megagrams of VOC per year would not be subject to the emission limits of the proposed new source standard. A major factor influencing the institution of these limits was PSTL industry comment concerning the treatment of research and development (R&D) coating lines. The industry felt that R&D lines should not be subject to the same emission limits as a production facility. Upon examination of these operations, the EPA determined that: the cost to control R&D emissions would be high, the achievable emissions reduction would be minimal, and normal production coating lines would operate well above the stated daily and yearly limits. For these reasons the exemption limits were developed. The limits were based on industry information concerning R&D operations. The exemption limits, however, apply to all new, modified, or reconstructed coating lines, and not just to R&D facilities. If either the daily or yearly limit is exceeded, the coating line would be subject to all the requirements of the proposed standard. If the exemption limits are not exceeded, the owner or operator must only record solvent usage at the coating line and report it to the Administrator.

The daily and yearly exemption limits are based on data received from tape and label companies on their R&D facilities and on the model plant analysis in Chapter 6 of the BID Manufacturers in the tape and label industry have indicated that 61 cm (24 in) coaters are very popular for use in R&D projects. This size corresponds to the small size model plant in the BID analysis. Industry sources also stated that R&D coaters, when used, only run about two hours a day. The model plant analysis determined that a 61 cm coater will use, on the average, about 29 kg (64 lb) of solvent per hour. A typical PSTL facility will then consume about 58 kg (128 lb) of solvent per day for R&D purposes. Taken on an annual basis, this translates to about 15 megagrams of solvent for a facility operating 6000 hours a year. The EPA feels this number is reasonable because industry sources proposed exemption emission limits of 5 to 10 megagrams per year for R&D coating lines.

Manufacturers also indicated that R&D projects are run for more than two hours a day in some cases. These cases occur when larger quantities of material are needed for quality testing and marketing purposes. Industry sources

*The most important case if *ASARCO, Inc.* v. EPA, 578 F. 2d 319 (D.C. Cir. 1978).

estimated that one-half a day or 4 hours is usually sufficient for these R&D coating situations. Based on this information and the model plant figures, the daily emission limit of 125 kg (275 lb) was calculated and determined to be reasonable. The level of the daily limit allows coating firms greater flexibility in their R&D operations.

The affected facility was chosen to incorporate the primary sources of VOC emissions from PSTL coating. The drying/curing oven represents the major source of VOC emissions within the affected facility. The coated web is heated in the oven where 80 to 95 percent of the solvent is evaporated and vented either to the atmosphere or to a control device. These oven emissions can be effectively controlled by ducting them so they discharge to the atmosphere through either a carbon adsorption or a thermal incineration system. One to eighteen percent of the total applied solvent escapes as fugitive emissions and zero to five percent ends up trapped in the final coated product. The area from the coating head to the entrance of the oven is potentially the highest source of fugitive VOC emissions. Hoods or enclosures can be used in this area to effectively capture fugitive emissions. Once captured the fugitives may be ducted to either the oven or to a control device.

Other equipment such as wind and rewind stations are a part of the affected coating line, but are not VOC emission sources. VOC emissions from formulation, storage, and cleanup operations are not included in this regulation. These emissions are not being regulated at this time because: (1) Formulation emissions are already controlled to low levels due to occupational safety reasons and (2) the solvent cleanup emissions are generally low concentration, low volume sources which are very difficult to capture and control.

Selection of Basis of Proposed Standards

This section describes the emission control technology applicable to the PSTL industry and the regulatory alternatives considered by EPA in the development of this standard. Included is a summary of the environmental, energy, and economic impacts, and nonair quality health impacts of the aternatives and a description of the basis of the proposed standards.

Control Technologies. Available control technologies for reducing VOC emissions from PSTL facilities include the use of low-solvent coatings or an emission capture and control system. Low-solvent coatings provide the best environmental alternative for reducing VOC emissions. By 1985, it is estimated that 80 percent of all pressure sensitive coatings will be low-solvent-type coatings. These alternative coatings are available for both adhesives and releases and can be purchased as waterborne, emulsion, or 100 percent solids formulations. Advantages of these coatings include low cost, low energy use, good viscosity even at a high solids content, and negligible air pollution, toxicity, or fire hazards. However, low-solvent coatings are not technologically advanced to the point where they can be interchanged with all solvent-based formulations. Major technical problem areas for low-solvent coatings include cohesive strength, solvent resistance, UV degradation, wettability, and dimensional stability. The added difficulty of total customer acceptance further reduces the range of product substitutability for low-solvent coatings. Because low-solvent coatings cannot be applied in all cases, they cannot be used as the sole basis for the proposed standard.

Carbon adsorption and thermal incineration used in conjunction with emission capture systems have both been used as control devices to reduce VOC emissions from pressure sensitive tape and label coating facilities. Available performance data indicate that the two devices are equivalent in reducing VOC emissions. Although both control devices have experienced operating problems, it has been demonstrated that they can be successfullly used. Two of the problems are: (1) Poor control performance on low VOC concentration gas streams and (2) plugging or fouling problems resulting from volatilization of oligomeric adhesive and release materials. Both of these problems can be reduced or eliminated through proper design and operation of drying ovens and the control devices to the extent that a facility will comply with the proposed standard.

A thermal incinerator is an effective VOC emission control device for all types of solvents. Thermal incinerators operating at temperatures greater than 760°C (1400°F) have demonstrated the ability to achieve at least 95 percent reduction of all VOC in the incinerator feed. The EPA document, "Control of Volatile Organic Emissions from Existing Stationary Sources—Volume I: Control Methods for Surface Coating Operations" (EPA–450/2–76–028), verifies that this level of reduction is achievable. Catalytic incineration has also been demonstrated, in the same EPA document, to be capable of achieving at leat 95 percent efficiency in reducing VOC from an inlet feed stream. Chapter 4 of the BID examines the use of catalytic incineration for PSTL plants. However, the primary incineration focus in this rationale was devoted to thermal incineration, because no catalytic incineration was found in use in PSTL facilities for VOC emissions control.

Thermal incineration is most cost effective when heat exchange equipment is used to recover the heat from the combustion of the solvent and any additional fuels. At 40 percent of the lower explosive limit (LEL), the implementation of primary (preheating of the incinerator feed gases) and secondary heat recovery could supply the primary and secondary heat requirements for one coating line and the secondary requirements for another line. At the very least, primary heat recovery should be included in new incinerator design. Additional heat can be easily recovered and used as heat energy for work area space heating.

The question of LEL is important for safety and economic reasons. The LEL is the lowest vapor concentration in air, expressed as volume percent, at which the mixture would support a flame or explosion at temperatures below 121°C (250°F). Insurance safety regulations require normal operation at less than about 25 percent of the LEL. Operation up to 50 to 60 percent of the LEL is permitted when continuous vapor monitoring systems are employed to control the vapor concentration in the air. The operation of an incinerator at higher LEL values is cost effective because less supplemental fuel is required. While optimal, operating at high LEL levels is not always possible in every coating facility. Factors such as poor coating line design, operation at slow line speeds, and stream dilution by excess ventilation air may limit the achievable LEL. Occupational Safety and Health Administration (OSHA) rules may require excess ventilation air in some facilities to meet certain maximum solvent concentrations in the worker area.

Heat exchanger fouling has been one of the greatest problems with incineration systems. This is especially true in silicone release and adhesive systems. The silicone monomers which volatilize are oxidized in the incinerator and coat the heat exchanger surfaces as a silica material. Operating experience has indicated that routine heat exchanger surface cleanup is required for proper incinerator operation. The experience of one manufacturer with this type of system and these operating

problems is detailed in Chapter 4 of the BID.

The second means of effectively controlling VOC emissions from pressure sensitive tape and label coating lines is carbon adsorption. Several plants in the industry presently use this technology with success. Test data from PSTL plants and self-monitoring data supplied by PSTL manufacturers have indicated that operational efficiency levels of at least 95 percent or greater are attainable with carbon adsorbers. For the purposes of this analysis, carbon adsorbers were assumed to be 95 percent efficient in reducing VOC emissions. This efficiency level has been attained in PSTL facilities despite the occurrence of problems such as: bed fires, carbon fouling, freeze damage, corrosion, and low LEL inlet streams. Carbon adsorption systems are generally regenerated with steam, although any hot, non-reactive gas can be used to strip the beds. If steam is used, the carbon adsorption system is generally limited to solvents which are not water soluble (unless the operator uses add-on distillation or separation processes). All systems currently operating on PSTL coating lines in the United States use steam for carbon bed regeneration. Fouling of the carbon beds by volatilized adhesives and releases is a recurring operational problem. This problem can be adequately reduced by filtering the feed gas before it enters the carbon beds. Again silicone materials are a greater problem than the adhesive resins. Generally carbon beds on silicone coating lines are changed twice as often as beds on rubber or acrylic resin coating lines.

Low VOC concentration gas streams (less than 10 percent LEL) are a problem for both carbon adsorption and incineration VOC control equipment. In incinerators the low concentration gas stream will require much more fuel to incinerate the same amount of solvent gases as in a high concentration stream. The higher fuel usage will mean higher operating costs. Data from existing PSTL facilities demonstrate that the attainment of a 90 percent overall VOC emission reduction, on a monthly basis, is possible at less than 10 percent LEL.

For carbon adsorption systems, the low VOC concentration means poor bed performance. The beds are usually designed for a certain maximum VOC concentration based on a desired outlet VOC concentration. Operating experience has shown that at low solvent concentrations the performance of the bed decreases resulting in a lower overall VOC reduction. Higher gas stream, VOC concentrations can be maintained through design of drying ovens with high turn down ratios and air tight gas ducting systems. Operators can also minimize the low VOC concentration problem by, whenever possible, coating products with similar solvent loadings on the same coating line.

The use of hoods or enclosures can be an effective means for capturing fugitive solvent emissions around the coater area. Fugitive solvent is that solvent which is emitted from the coating applicator and flashoff areas. The hood can be located directly over the web to capture vapors released from the coated surface. In small lines the time interval between when the web is coated and when it enters the oven is about two to five seconds. In large and medium lines the interval is two seconds or less. Since most solvents are heavier than air, floor seeps and hooding under the web can also be used to effectively capture emissions. The ideal situation is to totally enclose the coater and get an effective 100 percent VOC capture. When a hood or enclosure is used, all of the captured fugitive solvent emissions should be ducted back into the system and the control device. If the captured gases are used as makeup air to the ovens, the dilution of the oven gases is minimized.

Presently no total enclosure structures are used in the pressure sensitive tape and label industry. However, when surveyed, firms engaged in similar coating operations (for example, zinc oxide paper coating) responded favorably concerning the use of totally enclosed coaters. No problems related to enclosure use were given. In addition to environmental benefits, occupational safety concerns were also given as a reason for enclosure use. Enclosures were useful in reducing VOC levels along the floor and in the general work area around the coater, thereby lessening any potential explosion hazards.

In the tape and label industry one firm does operate a total building air evacuation system. This system removes all air from the coating building and sends it to a carbon adsorber. In effect the plant operates a total building enclosure. Calculations on the overall efficiency of this system indicate that a solvent capture efficiency of 95 percent is being obtained.

The best controlled coating operating examined in the tape and label manufacturing industry has four coating lines controlled by one carbon adsorption unit. Three of the lines are 0.71 meters (28 inches) wide and one line is 1.4 meters (56 inches) wide. The company produces a wide variety of label stock materials. Their operations are typified by short products runs (less than four hours), varied line speeds, and varied solvent-adhesive mixtures. These operating conditions make this facility a more difficult control situation than operations which run on a continuous basis. Over a four week period this system has shown an overall solvent recovery efficiency of slightly greater than 93 percent. During that time the company performed 140 runs and used such solvents as toluene, acetone, hexane, ethyl acetate, methyl ethyl ketone, rubber solvent, heptane, xylene, ethyl alcohol, isopropanol and recovered solvents. The coating lines use hoods to capture VOC emissions over the freshly coated web. The hoods are ducted into the ovens. The oven makeup air is pulled from the coater room with the ovens running at a slightly negative pressure with respect to the room. The overall effect is to draw all fugitive emissions into the oven with their eventual discharge through the carbon adsorption system. This plant demonstrated that high VOC reductions can be achieved even with low VOC concentration streams. During this four week recovery period the LEL in the system was less than ten percent.

A second tape coating facility with a carbon adsorption control system has a near 90 percent overall reduction. This system has hoods over the coating areas; however, all hood gases are vented directly to the atmosphere. Test data indicate that if the solvent vapors captured by the hoods are ducted back into the ovens the system would show a greater than 90 percent overall VOC reduction. Further data from this plant indicated an average overall VOC reduction of 90 percent for the entire year of 1979. The overall reduction for most of the calendar months was 90 percent or more. In the latter part of the year the overall reduction dropped below 90 percent on a monthly basis. This drop occurred because the carbon life of the control device had been exceeded by several months. With the installation of new carbon the overall reduction efficiency once again reached 90 percent or more. Through April of 1980 an average overall VOC reduction of about 94 percent has been attained.

Regulatory alternatives. The regulatory alternatives considered in developing the standard are based on the methods available to control the VOC emissions from the PSTL industry. In this industry the two primary emission sources are the oven exhausts and fugitives, with the oven exhausts being the more significant source. Therefore, the regulatory alternatives

are designed to control: (1) The oven emissions only or (2) the oven and fugitive emissions together.

Regulatory Alternative I is a no additional regulation alternative. This alternative represents what could happen if no NSPS were written and new sources were regulated by the SIP regulations. The recommended guideline for the SIP regulations represents a system which captures 90 percent of all volatilized solvents and then destroys or recovers 90 percent of those emissions. The overall reduction of VOC emissions from all affected facilities would be about 80 percent. The Alternative I control level is the baseline of comparison for the other regulatory alternatives. Regulatory Alternative I control could be achieved by the use of carbon adsorption, incineration, or low-solvent coatings.

Regulatory Alternative II is based on the control of oven emissions only. This regulatory alternative is very similar to Alternative I except that the efficiency of the add-on control device is selected as 95 percent rather than the 90 prcent control level because it is more indicative of current control system operations. Therefore, with a capture efficiency of 90 percent, the overall VOC reduction for this control system is approximately 85 percent. Carbon adsorption, incineration, or low-solvent coatings could be used to control emissions under this alternative.

Regulatory Alternative III is based on the control of both oven and fugitive VOC emissions. To obtain a high degree of fugitive capture a fugitive control device (such as a hood or a complete enclosure of the coating area) is used between the coater and the oven. The caputured fugitive VOC emissions are ducted into the oven or the add-on control device. The recommended method of ducting is to use the captured gases containing fugitive VOC as makeup air to the drying oven. Control of the fugitives results in a higher VOC capture. In this case, 95 percent of the applied solvent that is volatilized is captured. Under Alternative III the control device reduces 95 percent of the captured emissions, and an overall VOC reduction of 90 percent or greater is achieved. Data from existing well-designed pressure sensitive tape and label coating facilities indicate that up to 93 percent overall VOC reduction can be achieved. Chapter 4 and Appendix C of the BID examine data from well-controlled facilities in greater detail.

Environmental, Energy, and Economic Impacts

The environmental, energy, and economic impacts of the NSPS are based on a comparison of the expected impacts of Regulatory Alternatives II and III to Regulatory Alternative I. The overall impacts of the regulatory alternatives are heavily influenced by the predicted decline in the use of organic solvent-based systems. Currently, 80 to 85 percent of all pressure sensitive tape and label coatings are applied with organic solvent formulations. By the year 1990 it is predicted that organic solvent coating will only constitute 10 percent of PSTL all coatings. Based on total solvent use these numbers represent approximately 600,000 megagrams (metric tons) of solvent used in 1978 while only 91,000 megagrams (metric tons) are expected in 1990. The use of organic solvent coatings will decline because of: (1) The increasing availability of alternative low-solvent coatings, (2) the high cost and lessening supply of organic solvents, and (3) increasing environmental regulations relating to solvent use.

Environmental Impacts. An analysis was made to compare the estimated national impacts of VOC emissions, wastewater effluents, solid waste generation, and energy use associated with the regulatory alternatives. The impacts in 1978 are based only on Regulatory Alternative I which represents no NSPS action and SIP adoption of the CTG recommended emission limit. For all environmental parameters the impacts decrease due to the predicted dramatic increase in the use of energy-efficient, low-solvent coating technology. In 1985 the expected increases in adverse environmental impacts from Regulatory Alternatives II and III are not major.

By 1985 it is predicted that the PSTL industry will use 125,000 megagrams (metric tons) of solvents. Regulatory Alternative I (no NSPS with SIP control only) would result in expected total VOC emissions of 27,400 megagrams (metric tons) per year. If Regulatory Alternative II is applied these emissions are expected to be reduced by 2,600 megagrams (metric tons) to 24,800 megagrams (metric tons) per year. This represents a 9.5 percent reduction in emissions. If Alternative III control is exercised the total VOC emissions are expected to be 23,100 megagrams (metric tons) per year. This represents a 16 percent reduction in total emissions over the projected baseline control level.

Wastewater discharge from PSTL coating operations increases with the use of carbon adsorption systems for VOC control. The additional wastewater comes from steam condensate which is separated from the recovered solvent. Generally this water is routed into local waste treatment systems or is emitted directly to the environment. If one assumes that all VOC emissions from PSTL coating facilities are controlled by carbon adsorption units (worst case estimate), the resulting wastewater flow for Alternative III is 13 percent greater than that expected from systems required to meet the Alternative I control level. In 1985, if all the solvent-based coating facilities used carbon adsorption, the total amount of wastewater would be about 20 million liters per year. The amount of VOC potentially in this volume of water is about 10 megagrams (metric tons). Even in the worst case situation the proposed standard is reasonable.

The solid waste impact from the addition of VOC controls in the PSTL industry is expected to be small. The use of carbon adsorption systems produces waste activateds carbon. The carbon must be replaced every one to six years depending on performance. The waste carbon can be landfilled, burned as a solid fuel, or sold to firms which reactivate the carbon. The landfill operation represents the greatest potential adverse environmental problem. This problem can be minimized by proper design, construction, and operation of the landfill site. In 1985 the estimated national incremental carbon solid waste production from PSTL facilities is approximately 55 megagrams (metric tons). This waste load would occur under Regulatory Alternative III control. The solid waste impact is reasonable when compared to the total nationwide VOC reduction being achieved.

Energy Impact. The total industry-wide use of electricity and fossil fuels is expected to decline in the next ten years. The primary reasons for this decline is the greater use of more fuel efficient, low-solvent systems, such as hot melts and waterborne adhesives and 100 percent solids and waterborne releases. The low-solvent systems eliminate the need for large, fuel-consuming solvent drying ovens.

For an individual coating facility, the supplement energy use is higher for a solvent-type coating line with an add-on VOC control device than a line with no controls at all. More electrical energy is needed to power an increased number of fans and fans with higher capacities. For coating lines controlled by carbon adsorption units, fossil fuels must be used to run the steam boilers. Coating lines controlled by incineration would have fuel requirements that are dependent on the concentration of the

incinerator feed gases. If the concentration can be maintained near 40 percent LEL, fuel requirements will be low.

There is a potential in the PSTL industry for a net national energy savings. This savings would be possible if many or all solvent-based coating lines used solvent recovery control systems. The recovered solvent more than offsets the supplemental energy needed to operate the systems. The net recovered solvent could be translated into barrels of oil, consequently equaling barrels of oil that would not then have to be imported.

In 1985, Regulatory Alternative II would have an increased energy requirement of about 7,900 barrels (1.26 million liters) of crude oil per year above that required by Regulatory Alternative I. If all solvent-based coating lines were controlled by carbon adsorption to the Alternative II level, a best case, gross energy savings of about 23,600 barrels (3.75 million liters) of crude oil is estimated. By deducting the required energy for controls, a potential net national energy savings of 15,700 barrels (2.5 million liters) of crude oil exists.

Under Regulatory Alternative III an incremental (above Alternative I) energy demand of approximately 12,000 barrels (1.9 million liters) of crude oil is projected. Assuming all controls are carbon adsorption units, a gross national energy savings of about 39,100 barrels (6.2 million liters) of crude oil is predicted. This gross savings equates to a potential net national energy savings of 27,100 barrels (4.3 million liters) of crude oil for Alternative III. This estimate reflects the best case energy impact.

If all sovlent-based coating lines were controlled by incineration the worst case national energy impacts result. Because no solvent is recovered, there are no credits to offset the increased energy used by the VOC control systems. For Alternative II control an annual 17,700 barrels (2.8 million liters) of crude oil may be consumed by the PSTL industry over that required under Alternative I. Under Alternative III incinerations controls would require aproximately 31,000 barrels (4.9 million liters) of crude oil per year.

Neither total carbon adsorption nor total incineration control is anticipated in this industry. The actual use of the two control devices will be determined by the availability and price of solvent, the applicability of alternative fuels, the rapidity with which low-solvent technologies replace solvent-based ones, and the stringency of environmental regulations.

Economic Impact. The economic impacts of all three regulatory alternatives are minimal. In cases where they can be used, owners or operators will invest in low-solvent coating methods such as 100 percent solids or waterborne coatings. If technological constraints prevent the use of waterborne and 100 percent solid technologies, the regulatory alternatives will have a small impact on the industry. Based on the net present value (NPV) analysis, the large lines will generally experience a greater impact than the medium and small lines. Industry-wide, it is estimated that a price increase of 0.0 to 0.9 percent would be required to offset the impact of the NSPS.

The economic impact of the NSPS was evaluated through the costing of model facilities. These model facilities are based on sizes and flow-rates which represent typical new coating facilities. For this study, three line widths (0.61 m, 0.9 m and 1.5 m) and three line speeds (0.13 m/sec, 0.30m/sec, and 1.2 m/sec) were examined. The large width and high speed were combined in one case to represent a facility which is a large volume (39 million m^2/year) producer. The medium and small widths and slower speeds were combined to represent facilities which are small volume (1.7 million m^2/year and 5.8 million m^2/year) coating operations. The adhesive coating cases were examined separately from the silicone release coating operations. Tandem coating facilities were also analyzed during the economic study.

In the impact analysis, alternative low-solvent technologies are used to give a comparison for the systems which required add-on VOC controls. These alternative systems include hot melt and waterborne adhesives and 100 percent solid and waterborne silicone releases.

Detailed cost data were developed for the adhesive and silicone release model plants. All cost data were based on model plants that would be operating for 6,000 hours per year. The model plant costs were used in an economic model to assess the economic impact of the proposed standard. Both control equipment and coating line costs were developed. A discount rate of 16 percent and capacity utilization rates of 75 and 100 percent were used in the analysis. Inputs on different company structures were also used in the economic model. The model takes all the inputs and analyzes the various alternatives to rate them on net present value (NPV). The alternatives with the highest NPV's are considered as the best alternatives. High NPV's are advantageous because they represent the highest annual cash flows generated by an investment. All impacts represent the situation in 1985.

An economic analysis was not performed for the precoat coating lines because the physical and operational characteristics of a precoat line are very similar to those of release coat lines. To avoid duplications of effort and information, only release coat lines were examined in the economic analysis. Conclusions determined for release coat lines would apply to precoat coating lines.

To adequately represent the alternatives available to a coating operation the economic analysis is done from two perspective cases. In the unconstrained case, it is assumed that both low-solvent and high-solvent technologies can be used as identical product substitutes. This means that the 100 percent solid and waterborne formulations will produce a product equal to that of the solvent systems. In the constrained case, it is assumed that neither waterborne nor 100 percent solids coatings can be used as solvent-based product substitutes. A firm may only use solvent-based technology (with controls) to produce a tape or label product.

In the unconstrained cases, Regulatory Alternative II and III would have no impacts on the pressure sensitive tapes and labels industry. Waterborne and 100 percent solids coatings are available that meet the control requirements of these alternatives. Because low-solvent systems are more profitable than solvent-based ones, firms in the PSTL industry would have an economic incentive to adopt them even in the absence of an NSPS based on Alternatives II or III. The regulatory alternatives would not force firms to change the type of coating line they would build in the absence of any regulatory alternatives.

In the constrained cases, Regulatory Alternatives II and III would have minor impacts. Under Alternative II control, a product price increase of 0.0 to 0.4 percent would result if all costs for controls were passed on to the consumer. If all costs were absorbed by the manufacturer, an industry-wide decrease in return on investment (ROI) of 0.0 to 0.6 percent would result. Under Alternative III control, a product price increase of 0.0 to 0.9 percent is predicted. Full cost absorption by the manufacturer would reduce the ROI by 0.0 to 1.0 percent. With both regulatory alternatives, the large coating lines would be slightly more impacted than the medium and small lines.

The regulatory alternatives would have little or no impact on the industry's

growth rate and structure. The availability of low-solvent technologies and the small price and ROI impacts on the conventional solvent-based systems imply that the regulatory alternatives would not deter new investment and adversely affect growth. Although the large facilities would be affected more than the medium and small facilities, the difference is not great enough to put the large facilities at a competitive disadvantage. Thus, the regulatory alternatives would not cause any significant changes in the structure of the industry.

Best System of Emission Reduction

Based on the environmental, energy, and economic impacts, Regulatory Alternative III is selected as the best system of continuous emission reduction. This alternative is considered affordable and the impacts reasonable. Although this alternative is based on the use of a control device operated in conjunction with a well-designed VOC capture system, It is recognized that low-solvent coatings are available for some applications and are just as effective in reducing VOC emissions.

The control device may be either a carbon adsorber or incinerator. Both control devices have been determined to be capable of at least 95 percent efficiency in reducing VOC emissions. The attainable efficiency of VOC capture systems has been estimated based on PSTL facilities' overall VOC emission reduction data and control device efficiencies for these systems. Based on these calculations the best hooding and enclosure systems are 95 percent efficient in capturing all VOC emissions from a coating operation. The remaining five percent of total emissions are trapped in the coated product or are lost as fugitive emissions. The continuous overall emission reduction achievable by the best system is 90 percent. After consideration, the Administrator has determined that under normal operating conditions all affected facilities could achieve the level of the proposed standard using the best system.

Selection of Format of Proposed Standard

The formats were examined based on their effectiveness in ensuring overall VOC control. The criteria for choosing the format are effectiveness, compatibility with existing coatings and control systems, complexity of compliance testing, and ease of application in the industry.

The formats considered for the pressure sensitive tape and label industry were: (1) Total concentration of emissions from all exhaust gases discharged to the atmosphere, (2) kilograms of emissions per unit of production, (3) control efficiency, and (4) kilograms of emissions per unit weight or volume of coating solids. The following paragraphs discuss the advantages and disadvantages of the regulatory formats.

An allowable concentration of emissions in the exhaust gases discharged to the atmosphere is the easiest standard to enforce. Direct emission measurements can be made using Reference Method 25 on a single effluent stream. The major disadvantage of this format is its poor effectiveness in identifying overall VOC control. The level of fugitive emissions capture cannot be determined with a single point measurement. Such a determination requires either absolute containment or material balance testing of all potential points. As stated earlier, fugitives may amount to 18 percent of the total applied solvent. Another disadvantage is that it does not promote efficient oven energy use. In order to reduce oven energy consumption, the operator generally tries to increase the concentration of solvent in the oven exhaust gases. Therefore, more solvent leaves in a smaller volume of gas. This means lower energy consumption because eneregy use is approximately proportional to oven exhaust gas flow rate. With the higher concentration the operator is required to get a higher percent VOC reduction than an operator with less efficient ovens. In fact, concentration limits allow an operator to emit twice as much solvent by simply doubling the amount of dilution air drawn through the ovens. The overall effect is to promote higher energy consumption, while allowing greater total VOC emissions.

A format of kilograms of emissions per unit of production relates emissions to individual plant production on a direct basis. This type of standard would be inequitable for different types of coatings. In the PSTL industry, adhesive coatingss vary in thickness and in kilograms of VOC coated per unit area of production. This is further complicated by the inclusion of solvent silicone release and precoat coatings. These coatings tend to be much thinner and contain less VOC per unit area of production than adhesive coatings. Therefore, if a single value for the standard was used, some solvent coatings would require no additional controls while others would require a very high level of control.

The control efficiency standard would be developed from two viewpoints. The first would be to set a control level across the add-on control device. This form would provide a good means for reducing oven emissions but would not insure the control of fugitive emissions. The second viewpoint would require an overall VOC reduction based on the total amount of solvent in the formulated coating before application. This would include both fugitive VOC emissions and oven emissions. Compliance testing for this situation would require a material balance-type test which is a problem for any standard.

A regulatory format which would relate total allowable mass of VOC emissions to the amount of coating applied would be a very effective standard. For the PSTL industry, this form was examined for mass of VOC emissions with respect to volume of coating, volume of coating solids, and weight of coating solids. Weight of coating solids was chosen as the best of these forms because most formulations are derived on a weight basis. Generally, resin density is constant. Therefore, the weight basis is easy to calculate from formulation data.

The format of the proposed standard is a combination of the percent overall VOC reduction and the mass of VOC emissions per mass of coating solids formats. The percent overall VOC reduction would provide an effective means of requiring an overall VOC control, while not being prohibitive for high-solvent coatings. The mass emission per weight of coating solids would allow the use of low-solvent coatings without the need for all-on VOC control devices. This combination would permit add-on VOC controls for nearly all solvent-based coating systems and promote the development and use of low-solvent coatings.

Selection of Emission Limits

Section 111(a)(1) requires the emission limits to reflect "application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated." Section 111(a)(1). The "best technological system" defined by Section 111(a)(1) is one that is not "exorbitantly costly." *Essex Chemical Corp.* v. *Ruckleshaus*, 486 F. 2d 427, 433 (D.C. Cir. 1973).

Application of the "best technological system" results in a two-step standard: for coatings with VOC contents of 2 kg/kg of coating solids or less, the standard is 0.2 kg/kg; for coatings with greater

than 2 kg/kg VOC content, the standard is a 90 percent reduction in VOC emissions.

As discussed earlier, VOC reductions of 90 percent are achievable by systems of capture and control. However, the cost and energy requirements of achieving VOC emission reductions vary according to the VOC content of the coating being controlled. The lower the VOC content of the coating, the higher are the cost and energy requirements of achieving a given reduction in emissions. This is for two reasons. First, a given percent control of lower VOC coatings generally requires capture and control systems of at least the same size and cost as the same percent control of higher-VOC coatings, but it achieves less mass emission reduction because there is less VOC to be controlled. Second, the cost and energy requirements of controlling lower-VOC coatings in incinerators are further increased by the need to use additional supplemental fuel to operate the incinerator.

In the Administrator's judgment, the cost and energy requirements of a capture and control system that achieves 90 percent reduction are reasonable on coatings with VOC contents of 2.0 kg/kg and greater. Such a control system is therefore the "best technological system," and the standard for such high VOC coatings is 90 percent reduction.

For coatings with lower VOC contents, the "best technological system" is one that can achieve 0.2 kg/kg. In the Administrator's judgment, the cost and energy requirements of achieving significantly greater emission reduction on such lower VOC coatings would be exorbitant. Therefore, the standard for such coatings is 0.2 kg/kg. This can be achieved by all sources at reasonable cost and energy requirments.

The effect of solvent retention in the final tape of label product and its impact on the achievability of a 90 percent overall emission reduction were considered. Test data obtained during this study indicate that the amount of solvent retained in the product does not affect the ability of a facility to achieve the proposed standard. A well-controlled PSTL facility has demonstrated a four-week overall VOC emission reduction of 93 percent. This overall reduction includes the amount of solvent that was retained in the product. During this period the facility coated 18 different adhesives with varying amounts of retained solvent. Neither the four week period nor the many varied adhesive products coated (i.e., varied amounts of retained solvent) affected the plant's ability to achieve the proposed standard. Therefore EPA believes that 90 percent overall emission reduction efficiency can be achieved under all solvent retention conditions.

Selection of Compliance Procedures

After the required initial performance test, compliance with the proposed standard will be determined on a calendar month basis. Every calendar month will be considered a performance test for carbon adsorption-controlled coating lines, for incinerator-controlled coating lines, and for coating lines using low-solvent coating technology. The owner or operator will report to the Administrator within ten days following the end of a calendar month only if an affected facility exceeded the proposed standard for that calendar month being reported.

The variability of operation of the PSTL industry makes it well-suited to a monthly compliance period. Many products are produced in this industry using hundreds of different coatings. Operating parameters such as line speed, line width, length of a coating run, product solvent retention, and control device solvent hold-up vary substantially within this industry on a daily basis. The combination of these factors influences the quantity of emissions and the ability to meet a standard. Compliance with the proposed standard on a monthly basis would allow enough time for coating system fluctuations to average out.

To determine compliance with the proposed standard, an owner or operator of an affected facility using low-solvent coatings must calculate the weighted average of the mass of VOC (solvent) used per mass of coating solids applied each calendar month. The mass of VOC per mass of coating solids applied can be obtained by using a modified version of Reference Method 24 or coating manufacturer's formulation data. At any time the Administrator may require a Reference Method 24 test to verify the VOC content. The reference method must be performed so that mass per mass units are obtained and not mass per volume units as the method is currently written. The mass per mass modification actually simplifies the method. If the calculated weighted average is less than or equal to 0.20 kg VOC per kg of coating solids applied, compliance with the proposed standard would be demonstrated. Affected facilities with weighted averages greater than 0.20 would have to install add-on control devices to achieve compliance with the proposed standard. For enforcement purposes Reference Method 24 and not manufacturer's formulation data would be used.

Every affected facility using add-on control devices to achieve compliance with the proposed standard, must determine the weighted average of the mass of VOC used per mass of coating solids applied each calendar month. The weighted average VOC content would be compared to the 0.20 kg limit each month to determine the required level of overall VOC reduction. The maximum required overall VOC reduction is 90 percent.

Affected facilities controlled by carbon adsorption will determine monthly compliance using a solvent inventory test. The total mass of solvent used every calendar month will be divided by the total mass of solvent recovered by the carbon adsorber every month to determine the overall VOC emission reduction obtained. If the overall VOC emission reduction obtained is greater than or equal to the required overall reduction, compliance with the proposed standard is demonstrated.

Affected facilities controlled by incineration will determine monthly compliance by comparing the required overall VOC emission reduction of each calendar month to the overall VOC emission reduction demonstrated during the most recent performance test which complied with the proposed standard. If the required monthly reduction is less than or equal to the performance test reduction, the affected facility is in compliance with the proposed standard.

Modification and Reconstruction

Facilities which are modified or reconstructed as defined in 40 CFR 60.14 and 60.15 after the date of proposal of this standard are subject to the standard. In the case of PSTL facilities, a modification, and thus an increase in VOC emissions, will most likely be related to an increase in production. Production increases contributing to emission increases can result from changes in web width, line speed, or hours of operation. An increase in the hours of operation is specifically excluded from new source performance standards. If changes in line speed and line width are part of the existing equipment capability and do not require capital expenditures, they are also excluded from new source performance standards.

Production increases, however, may require capital expenditures, although this is not expected to be a frequent occurrence. A coating line with a drying oven is usually designed for a maximum solvent vaporization loading. The limiting factor is the LEL level allowed in the ovens. Line speed and line width can often be readily changed as long as

the production is kept under the maximum design of the oven. If production is increased above the maximum designed for the oven, a significant capital expenditure will be made for larger exhaust fans and possibly larger recirculation fans, and larger drive motors for the coater and wind and unwind equipment. If there is an increase in VOC emissions the facility will be a modification and will have to comply with the proposed standard. All control procedures previously discussed are applicable to modified PSTL facilities, therefore, the proposed standard is determined to be reasonable for such facilities.[11]Reconstructed facilities are also a potential occurrence in this industry. Existing control technologies would be applicable to the VOC emissions from such facilities. Because the emissions from reconstructed facilities can be controlled to the level specified in Regulatory Alternative III, the proposed standard would be reasonable for these types of facilities.

Selection of Monitoring Requirements

Monitoring requirements are included in the proposed standard to ensure good operation and maintenance of the VOC emission control equipment. Monitoring procedures for the proposed standard were chosen based on three factors: Reasonable cost, ease of execution, and utility of the resulting data to both the owner and to EPA for assuring continued proper operation.

Affected facilities controlled by incineration must monitor the temperature of the incinerator exhaust gases. The average temperature is being monitored to determine the occurrence of improper incinerator operation. The temperature drops stated below shall be indications of improper incinerator operation. For thermal incinerators the exhaust gas temperature must be continuously monitored and recorded. Any three hour period (during actual coating operations) during which the average temperature of the device is more than 28C° (50F°) less than the average temperature of the device during the most recent performance test complying with the proposed standard shall be reported to the Administrator. For catalytic incinerators the gas temperature upstream and downstream of the catalyst bed must be monitored. Any three hour period (during actual coating operations) during which the average temperature of the device immediately before the catalyst bed is more than 28C° (50F°) less than the average temperature of the device during the most recent performance test complying with the proposed standard, or any three hour period during which the average temperature difference across the catalyst bed is less than 80 percent of the average temperature difference of the device during the most recent performance test complying with the proposed standard shall be reported to the Administrator.

Temperature monitoring equipment is usually a standard feature on most incinerators. For this reason, the requirement to monitor temperature should not be an additional cost burden on the industry. If it is not included, the cost to purchase and install an accurate temperature measurement device and recorder is estimated at $1,200.

Any affected facility which use incinerators to comply with the proposed standard and which uses a hood or enclosure to capture fugitive VOC emissions, must operate a monitoring device which continuously indicates that the hood or enclosure is operating. Examples of such devices include fan amperage meters and flow meters in ducts. No continuous monitoring will be required if the hood or enclosure system is interlocked with the affected facility's oven air recirculation system.

Selection of Performance Tests Methods

Performance test methods are used to determine the solvent content in the coating and the overall control efficiency of the add-on control system. Furthermore, the test method for determining control efficiency differs depending on whether carbon adsorption or incineration is used.

The proposed method for measuring the solvent content in the coating is Reference Method 24 promulgated at October 3, 1980 45 FR 65956 "Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings." This method combines several ASTM standard methods to determine the volatile matter content, density of the coating, volume of solid, and water content of the paint, varnish, lacquer, and related surface coatings. From this information, the mass of volatile organic compounds (VOC) per unit volume of solids is calculated.

Because the proposed PSTL regulation for coating is in units of mass of volatile organic compounds per mass of coating solids, Reference Method 24 must be modified so its results are in the same units as the standard. This actually shortens the test method by eliminating several steps because only the non-aqueous volatile content needs to be determined. For non-aqueous coatings, the procedure to be used is ASTM D 2369–73, "Standard Test Method for Volatile Content of Paints." For coatings with water, the previously mentioned procedure (ASTM D 2369–73) is combined with another procedure which determines the water content of the coating. There are two acceptable procedures for this: (1) ASTM D 3792, "Standard Test Method for Water in Water Reducible Paint by Direct Injection into a Gas Chromatograph," and (2) an ASTM draft "Standard Test Method for Water in Paint or Related Coatings by the Karl Fischer Titration Method." The results from these procedures are the nonaqueous volatile content of the coating (as a weight fraction) and the water content (as a weight fraction). The weight fraction solids content in the coating can also be determined from these procedures. The VOC content in the coating, in mass of VOC per mass of coating solids applied, may be determined by dividing the weight fracton of non-aqueous volatiles by the weight fraction of solids.

The estimated cost of analysis per coating sample is $50 for the total volatile content procedure (ASTM D 2369–73). For aqueous coatings, there is an additional $100 per sample for water content determination. Since the testing equipment is standard laboratory apparatus, no additional purchasing costs are expected.

In certain cases, for the proposed PSTL standard, the density of a particular coating may be required. The density may be determined from the coating manufacturer's formulation data or from a procedure that is a part of Reference Method 24. The procedure in Method 24 is ASTM D 1475–60, "Standard Test Method for Density of Paint, Varnish, Lacquer, and Related Products." The analysis of a coating sample would cost about $25. Testing can be performed with standard laboratory equipment.

If the amount of solvent in the coating exceeds 0.20 kg per kg of coating solids applied, then the efficiency of the vapor control system must be determined. The overall efficiency is determined by comparing the amount of solvent controlled (either recovered or destroyed) to the potential amount of solvent emitted with no controls. For the proposed standard two different performance test methods were selected. The method to use depends upon the type of add-on control device being installed. In the PSTL industry, only two types of control devices are expected: carbon adsorbers and incinerators.

For carbon adsorbers, performance is demonstrated by comparing the solvent used versus the solvent recovered. In

using a solvent inventory system, it is necessary to monitor two things: The amount used of each coating, and the amount of solvent recovered by the carbon adsorption system.

The performance test will consist of a one calendar month solvent inventory as opposed to the three test runs method specified in § 60.8(f). Compliance in the months following the performance test will also be determined on a calendar month basis.

To determine the efficiency of the carbon adsorber system, these data would be collected over a period of one calendar month. This time interval allows the test to be conducted using a representative variety of coatings and products, as well as reducing the impact of variations in the process that would otherwise affect the representativeness of a short-term test. It should be noted that this procedure determines the overall control efficiency based on the original amount of solvent used, not on the amount entering the carbon adsorber, and fugitive emissions are allowed as long as the overall control efficiency meets the standard.

The cost of such a performance test should be minimal since the solvent inventory data would be part of normal operating equipment in the plant. If not, the estimated purchase cost of two accurate liquid weight meters is $1,400.

Because incinerators destroy the solvent rather than recover it, a different type of performance test is used. The proposed procedure measures the mass of VOC (as carbon) in the incinerator system vents (incinerator inlet, incinerator outlet, and fugitive emission vents), and determines the incinerator system's overall control efficiency. There are important differences between the carbon adsorber and incinerator test procedures that should be noted. The test procedure for the carbon adsorber system relates the original amount of solvent used at the coating head to the amount of solvent controlled, i.e. recovered, by the adsorber. It is possible to compare the two amounts because the same measurement method is used (liquid solvent used versus liquid solvent recovered). However, for incinerator systems, the amount of solvent used should not be directly related to the amount of solvent controlled, i.e. destroyed, because different measurement procedures are used, (liquid solvent used in the coating is measured as mass of solvent, while the gaseous emissions destroyed are measured as mass of carbon). Thus, for incinerators, the amount controlled or destroyed is determined by using the amount of solvent measured in the inlet vent versus the outlet vent. The overall incinerator system control efficiency is determined by relating the amount destroyed to all the potential emissions.

To make the incinerator test procedure equivalent to the carbon adsorber test procedure, one must be able to measure all the potential emissions, both fugitive emissions and oven emissions ducted into the incinerator. That is, all fugitive VOC emissions from the web coating area must be captured and vented through stacks suitable for testing. Prior to the performance test for incineration-controlled affected facilities, the owner or operator will be required to construct a temporary total enclosure around the coating line for the purpose of capturing fugitive VOC emissions. A total enclosure is defined as any structure or building around the coating applicator and flashoff area or the entire coating line for the purpose of confining and totally capturing fugitive VOC emissions. If a permanent total enclosure exists on the line prior to the performance test, and the enforcing agency is satisfied that the enclosure is totally capturing fugitive emissions; the construction of a temporary enclosure is not required.

The concentration of VOC (as carbon) in the incinerator vent system is measured by Reference Method 25, "Determination of Total Gaseous Nonmethane Organic Emissions as Carbon (TGNMO)." The results of this method combined with the results of Reference Methods 1 through 4 yields the mass of VOC (as carbon) in the vent.

Three one-hour runs of Reference Method 25 are required for a complete test, with Reference Methods 2, 3 and 4 being performed at least twice during that period. Measurements at the inlet, outlet and fugitive emission vents should be performed simultaneously. The total time required for one complete performance test is estimated at 8 hours, with an estimated overall cost $4,000, plus $2,000 for each fugitive vent measured.

The TGNMO method (Reference Method 25) was selected to measure the VOC concentration in incinerators for certain reasons. It is simple to use, especially in explosive atmospheres or when sampling high-temperature, moist streams. Also because the detector used in Reference Method 25 measures all the non-methane organics as methane, all carbon atoms give an equivalent instrument response. Therefore, the problem of varying response ratios for different organic compounds (typical of all flame ionization units) is avoided.

The decision to propose two different performance test methods was made after considering several factors. It is usually preferable to have the same performance test method regardless of the type of control device. In this case, the stack sampling procedure described for incinerators is also applicable to carbon adsorbers. However, the solvent inventory method is a far more practical and accurate procedure. It is very inexpensive, requires no special technical sampling and analytical procedures, and has a test period of one month, so that a representative variety of coatings can be tested. Unfortunately, an inventory-type method cannot be applied to incinerators. The one-day TGNMO inlet and outlet stack test procedure is the best method for testing incinerators, but this method would become exorbitantly expensive and impractical if a longer test period were required. The advantages of the solvent inventory-type test for carbon adsorbers outweigh the disadvantages of having two different performance test methods.

Reports Impact Analysis

The reporting requirements necessitated by the proposed standard are authorized in Section 114 of the Clean Air Act. The proposed standard would require the preparation of three types of reports. First, the general provisons (Subpart A of 40 CFR Part 60) would require notification reports which inform the agency of facilities subject to new source performance standards (NSPS). These reports include notification of construction, anticipated start-up, acutal start-up, and physical or operational changes. Second, reports of performance test results and performance evaluations of the continuous monitoring systems would be required. These reports show whether a facility is initially meeting the level of the standard. Third, monthly reports explaining whether an affected facility is in or out of compliance with the standard would be required

The respondent group to the reporting requirements of the proposed standard would be the pressure sensitive tapes and labels (PSTL) industry. It is estimated that through the fifth year of standard applicability, approximately 290 new PSTL sources will have been established which would have to comply with the reporting requirements of the proposed standard. This number of sources includes adhesive, release, and precoat coating facilities. To implement the reporting requirements of the proposed standard, through the first five years of applicability, the PSTL industry would incur a manpower demand of about 12 man-years. Comments are invited on any of the reporting requirements of the proposed standard.

Section 60.447 of the proposed standard explains specific reporting requirements in further detail.

Public Hearing

A public hearing will be held to discuss the proposed standards in accordance with Section 307(d)(5) of the Clean Air Act. Persons wishing to make oral presentations should contact EPA at the address given in the ADDRESSES section of this preamble. Oral presentations will be limited to 15 minutes each. Any member of the public may file a written statement before, during, or within 30 days after the hearing. Written statements should be addressed to the Central Docket Section address given in the ADDRESSES section of this preamble.

A verbatim transcript of the hearing and written statements will be available for public inspection and copying during normal working hours at EPA's Central Docket Section in Washington, D.C. (see ADDRESSES section of this preamble).

Docket

The docket is an organized and complete file of all the information submitted to or otherwise considered in the development of this proposed rulemaking. The principal purposes of the docket are (1) to allow interested parties to readily identify and locate documents so that they can intelligently and effectively participate in the rulemaking process, and (2) to serve as the record in case of judicial review.

Miscellaneous

As prescribed by Section 111, establishment of standards of performance for the manufacture of pressure sensitive tapes and labels was preceded by the Administrator's determination (40 CFR 60.16, 44 FR 49222, dated August 21, 1979) that these sources contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare. In accordance with Section 117 of the Act, publication of this proposal was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies. The Administrator will welcome comments on all aspects of the proposed regulation, including economic and technological issues, and on the proposed test methods.

Comments are specifically invited from small PSTL companies on the definition of the affected facility. Larger companies in this industry have objected to the present definition. They feel the affected facility should be defined as a coating line from initial unwind to final wind. Any comments submitted to the Administrator on this issue should contain specific information and data pertinent to an evaluation of the affected facility definition. Alternative courses of action should be suggested.

It should be noted that standards of performance for new sources established under Section 111 of the Clean Air Act reflect:

> * * * application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated (Section 111(a)(1)).

Although there may be emission control available that can reduce emissions below those levels required to comply with standards of performance, this technology might not be selected as the basis of standards of performance due to costs associated with its use. Accordingly, standards of performance should not be viewed as the ultimate in achievable emissions control. In fact, the Act requires (or has the potential for requiring) the imposition of a more stringent emission standard in several situations.

For example, applicable costs do not necessarily play as prominent a role in determining the "lowest achievable emission rate" for new or modified sources located in nonattainment areas, i.e., those areas where statutorily-mandated health and welfare standards are being violated. In this respect, Section 173 of the Act requires that new or modified sources constructed in an area which exceeds the National Ambient Air Quality Standard (NAAQS) must reduce emissions to the level which reflects the "lowest achievable emission rate" (LAER), as defined in Section 171(3) for such category of source. The statute defines LAER as that rate of emissions based on the following, whichever is more stringent:

> (A) The most stringent emission limitation which is contained in the implementation plan of any State for such class of category of source, unless the owner of operator of the proposed source demonstrates that such limitations are not achievable, or
>
> (B) The most stringent emission limitation which is achieved in practice by such class of category of source.

In no event can the emission rate exceed any applicable new source performance standard (Section 171(3)).

A similar situation may arise under the prevention of significant deterioration of air quality provisions of the Act (Part C). These provisions require that certain sources (referred to in Section 169(1)) employ "best available control technology" (BACT) as defined in Section 169(3) for all pollutants regulated under the Act. Best available control technology must be determined on a case-by-case basis, taking energy, environmental and economic impacts and other costs into account. In no event may the application of BACT result in emissions of any pollutants which will exceed the emissions allowed by an applicable standard established pursuant to Section 111 (or 112) of the Act.

In all events, State Implementation Plans (SIP's) approved or promulgated under Section 110 of the Act must provide for the attainment and maintenance of NAAQS designed to protect public health and welfare. For this purpose, SIP's must in some cases require greater emission reduction than those required by standards of performance for new sources.

Finally, States are free under Section 116 of the Act to establish even more stringent emission limits than those established under Section 111 or those necessary to attain or maintain the NAAQS under Section 110. Accordingly, new sources may in some cases be subject to limitations more stringent than standards of performance under Section 111, and prospective owners and operators of new sources should be aware of this possibility in planning for such facilities.

This regulation will be reviewed four years from the date of promulgated. This review will include an assessment of such factors as the need for integration with other programs, the existence of alternative methods, enforceability, and improvements in emission control technology, and reporting requirements. The reporting requirements in this regulation will be reviewed as required under EPA's sunset policy for reporting requirements in regulations.

Section 317 of the Clean Air Act requires the Administrator to prepare an economic impact assessment for any new source standard of performance under Section 111(b) of the Act. An economic impact assessment was prepared for the proposed regulations and for other regulatory alternatives. All aspects of the assessment were considered in the formulation of the proposed standards to insure that the proposed standards would represent the best system of emission reduction considering costs. The economic impact assessment is included in the Background Information Document.

Dated: December 22, 1980.

Douglas M. Costle,

Administrator.

It is proposed that 40 CFR Part 60 be amended by adding a new Subpart RR as follows:

Subpart RR—Standards of Performance for Pressure Sensitive Tape and Label Surface Coating Operations

Sec.

60.440 Applicability and designation of affected facility.
60.441 Definitions and symbols.
60.442 Standard for volatile organic compounds.
60.443 Compliance provisions.
60.444 Performance test procedures.
60.445 Monitoring of operations and recordkeeping.
60.446 Test methods and procedures.
60.447 Reporting requirements.

Authority: Sec. 111, 301(a) of the Clean Air act as amended (42 U.S.C. 7411, 7601(a)), and additional authority as noted below.

Subpart RR—Standards of Performance for Pressure Sensitive Tape and Label Surface Coating Operations

§ 60.440 Applicability and designation of affected facility.

(a) The affected facility to which the provisions of this subpart apply is each pressure sensitive adhesive coating line, each release coating line, and each precoat coating line used in the manufacture of pressure sensitive materials.

(b) This subpart applies to any affected facility which begins construction, modification, or reconstruction after [—— date of publication in **Federal Register**].

§ 60.441 Definitions and symbols.

(a) Except as otherwise required by the context, terms used in this subpart are defined in the Act, in Subpart A of this part, or in this section as follows:

"Coating applicator" means an apparatus used to apply a surface coating to a continuous web.

"Coating line" means a coating applicator, flashoff area, and oven.

"Coating solids applied" means the solids content of the coated adhesive, release, or precoat as defined by Reference Method 24.

"Flashoff area" means the portion of a coating line after the coating applicator and usually before the oven entrance.

"Fugitive volatile organic compounds" means any volatile organic compounds which are emitted from the coating applicator and flashoff areas and are not emitted in the oven.

"Hood or enclosure" means any device used to capture fugitive volatile organic compounds.

"Oven" means a chamber which uses heat or irradiation to bake cure, polymerize, or dry a surface coating.

"Precoat" means a coating operation in which a primer, lacquer, or tackifying coating (or their equivalent) is applied to a surface as a precursor to the production of a pressure sensitive or release product.

"Pressure sensitive tape and label surface coating operation" means any coating line which coats a continuous web with either pressure sensitive adhesive, release or precoat coatings associated with pressure sensitive products.

"Solvent applied in the coating" means all organic solvent contained in the adhesive, release, and precoat formulations that is metered into the coating applicator from the formulation area.

"Total enclosure" means a structure or building around the coating applicator and flashoff area or the entire coating line for the purpose of confining and totally capturing fugitive VOC emissions.

"Volatile organic compound (VOC)" means any organic compound which is measured by Reference Methods 24 or 25.

(b) All symbols used in this subpart not defined below are given meaning in the Act or in Subpart A of this part.

"a" means the gas stream vents exiting the emission control device.

"b" means the gas stream vents entering the emission control device.

"C_{aj}" means the concentration of VOC (carbon equivalent) in each gas stream (j) exiting the emission control device, in parts per million by volume.

"C_{bi}" means the concentration of VOC (carbon equivalent) in each gas stream (i) entering the emission control device, in parts per million by volume.

"C_{fk}" means the concentration of VOC (carbon equivalent) in each gas stream (k) emitted directly to the atmosphere, in parts per million by volume.

"G" means the calculated weighted average mass (kg) of VOC per mass (kg) of coating solids applied each calendar month.

"M_{oi} means the mass (kg) of VOC per mass (kg) of coating solids applied in each coating (i) used in the calendar month.

"M_r" means the total mass (kg) of solvent recovered for a calendar month.

"M_{si}" means the mass (kg) of coating solids applied in each coating (i) used in the calendar month as measured by the reference method specified in § 60.446(a) or by the coating manufacturer's formulation data.

"Q_{aj}" means the volumetric flow rate of each effluent gas stream (j) exiting the emission control device, in dry standard cubic meters per second.

"Q_{bi}" means the volumetric flow rate of each effluent gas stream (i) entering the emission control device, in dry standard cubic meters per second.

"Q_{fk}" means the volumetric flow rate of each effluent gas stream (k) emitted to the atmosphere, in dry standard cubic meters per second.

"R" means the overall VOC emission reduction achieved for a calendar month (in percent).

"R_e" means the required overall VOC emission reduction (in percent).

§ 60.442 Standard for volatile organic compounds.

(a) On and after the date on which the performance test required by § 60.8 has been completed each owner or operator subject to this subpart shall—

(1) Cause the discharge into the atmosphere from an affected facility not more than 0.20 kg VOC/kg of coating solids applied as calculated on a weighted average basis for one calendar month; or

(2) Demonstrate for each affected facility;

(i) A 90 percent overall VOC emission reduction as calculated over a calendar month; or

(ii) The percent overall VOC emission reduction specified in § 0.443(b) as calculated over a calendar month.

(b) Any coating line which causes the discharge into the atmosphere of not more than 125 kilograms of VOC per day and 15 megagrams of VOC per year is not considered an affected facility and is not therefore subject to the emission limits of § 60.442(a). If either the 125 kilogram per day limit or the 15 megagram per year limit are exceeded, the coating line shall become an affected facility and will be subject to § 60.442(a) and all its associated subparts.

§ 60.443 Compliance provisions.

(a) To determine compliance with § 60.442(1), the owner or operator of the affected facility shall calculate a weighted average of the mass of solvent used per mass of coating solids applied for a one calendar month period according to the following procedures:

(1) Measure the VOC content (kg VOC/kg coating solids applied) of all coatings applied using the reference method specified in § 60.446(a) of this subpart or by using the coating manufacturer's formulation data.

(2) Compute the weighted average by the following equation:

$$G = \frac{\sum_{i=1}^{n} (M_{oi} \times M_{si})}{\sum_{i=1}^{n} M_{si}}$$

(3) For each affected facility where the value of G is less than or equal to 0.20 kg VOC per kg of coating solids applied, the affected facility is in compliance with § 60.442(a)(1).

(b) To determine compliance with § 60.442(a)(2), the owner or operator shall calculate the required overall VOC emission reduction according to the following equation:

$$R_q = \left(\frac{G - 0.20}{G} \right) \times 100$$

If R_q is less than or equal to 90 percent, then the required overall VOC emission reduction is R_q. If R_q is greater than 90 percent, than the required overall VOC emission reduction is 90 percent.

(c) Where compliance with the emission limits specified in § 60.442(a)(2) is achieved through the use of a solvent recovery system, the owner or operator shall determine the overall VOC emission reduction for a one calendar month period by the following equation:

$$R = \left[\frac{M_r}{\sum_{i=1}^{n} (M_{oi} \times M_{si})} \right] \times 100$$

If the R value is equal to or greater than the R_q value specified in § 60.443(b), then compliance with § 60.442(a)(2) is demonstrated.

(d) Where compliance with the emission limit specified in § 60.442(a)(2) is achieved through the use of a solvent destruction device, the owner or operator shall determine calendar monthly compliance by comparing the monthly required overall VOC emission reduction specified in § 60.443(b) to the overall VOC emission reduction demonstrated in the most recent performance test which complied with § 60.442(a)(2). If the monthly required overall VOC emission reduction is less than or equal to the overall VOC reduction of the most recent performance test, the affected facility is in compliance with § 60.442(a)(2).

(e) Where compliance with § 60.442(a)(2) is achieved through the use of a solvent destruction device, the owner or operator shall continuously record the destruction device combustion temperature during coating operations for thermal incineration destruction devices or the gas temperature upstream and downstream of the incinerator catalyst bed during coating operations for catalytic incineration destruction devices. For thermal incineration destruction devices the owner or operator shall report all three hour periods (during actual coating operations) during which the average temperature of the device is more than 28C° (50F°) below the average temperature of the device during the most recent performance test complying with § 60.442(a)(2). For catalytic incineration destruction devices, the owner or operator shall report all three hour periods (during actual coating operations) during which the average temperature of the device immediately before the catalyst bed is more than 28C°(50F°) below the average temprature of the device during the most recent performance test complying with § 60.442(a)(2), and all three hour periods (during actual coating operations) during which the average temperature difference across the catalyst bed is less than 80 percent of the average temperature difference of the device during the most recent performance test complying with § 60.442(a)(2).

(f) After the initial performance test required for all affected facilities under § 60.8, compliance with the VOC emission limitation and percentage reduction requirements under § 60.442 is based on the average emission reduction for one calendar month. A separate performance test is completed at the end of each calendar month after the initial performance test, and a new calendar month's average VOC emission reduction is calculated to show compliance with the standard.

(g) If a common emission control device is used to recover or destruct solvent from more than one affected facility, the performance of that control device is assumed to be equal for each of the affected facilities. Compliance with § 60.442(a)(2) is determined by the methods specified in § 60.443(c) and § 60.443(e) and is performed simultaneously on all affected facilities.

(h) If a common emission control device is used to recover solvent from an existing facility (or facilities) as well as from an affected facility (or facilities), the overall VOC emission reduction for the affected facility (or facilities), for the purpose of compliance, shall be determined by the following procedures:

(1) The owner or operator of the existing facility (or facilities) shall determine the mass of solvent recovered for a calendar month period from the existing facility (or facilities) prior to the connection of the affected facility (or facilities) to the emission control device.

(2) The affected facility (or facilities) shall then be connected to the emission control device.

(3) The owner or operator shall determine the total mass of solvent recovered from both the existing and affected facilities over a calendar month period. The mass of solvent determined in paragraph (h) (1) of this section from the existing facility shall be subtracted from the total mass of recovered solvent to obtain the mass of solvent recovered from the affected facility (or facilities). The overall VOC emission reduction of the affected facility (or facilities) can then be determined as specified in § 60.443(c).

(i) If a common emission control device is used to destruct solvent from an existing facility (or facilities) as well as from an affected facility (or facilities), the overall VOC emission reduction for the affected facility (or facilities), for the purpose of compliance, shall be determined by the following procedures:

(1) The owner or operator shall operate the emission control device with both the existing and affected facilities connected.

(2) The concentration of VOC (in parts per million by volume) after the common emission control device shall be determined as specified in § 60.444(c). This concentration is used in the calculation of compliance for both the existing and affected facilities.

(3) The volumetric flow out of the common control device attributable to the affected facility (or facilities) shall be calculated as a weighted average of the volumetric flows into the control device from the affected facility (or facilities) and the existing facility (or facilities). Compliance is determined by the use of the equation specified in § 60.444(c).

§ 60.444 Performance test procedures.

(a) The performance test for affected facilities complying with § 60.442(a) without the use of add-on controls shall be identical to the procedures specified in 60.443(a).

(b) The performance test for affected facilities controlled by a solvent recovery device shall be conducted as follows:

(1) The performance test will consist of one calendar month run and not the average of three runs as specified in § 60.8(f).

(2) The weighted average mass of VOC per mass of coating solids applied for a one calendar month period shall be determined as specified in § 60.443(a)(1) and § 60.443(a)(2).

(3) Calculate the required overall VOC emission reduction as specified in § 60.443(b).

(4) Inventory solvent usage and solvent recovery for a one calendar month period.

(5) Determine the performance of the solvent recovery device as specified in § 60.443(c).

(c) The performance test for affected facilities controlled by a solvent destruction device shall be conducted as follows:

(1) The weighted average mass of VOC per mass of coating solids applied for a one calendar month period shall be determined as specified in § 60.443(a)(1) and § 60.443(a)(2).

(2) Calculate the requried overall VOC emission reduction as specified in § 60.443(b).

(3) Determine the performance of the solvent destruction device by the following procedures:

$$R = \left[\frac{\sum_{i=1}^{n} (Q_{bi} \times C_{bi}) - \sum_{j=1}^{m} (Q_{aj} \times C_{aj})}{\sum_{i=1}^{n} (Q_{bi} \times C_{bi}) + \sum_{k=1} (Q_{fk} \times C_{fk})} \right] \times 100$$

(i) The owner or operator of the affected facility shall construct the overall VOC emission reduction system so that all volumetric flow rates and total VOC emissions can be accurately determined by the applicable test methods and procedures specified in § 60.446(b).

(ii) The owner or operator of an affected facility shall construct a temporary total enclosure around the coating line applicator and flashoff area during the performance test for the purpose of capturing fugitive VOC emissions. If a permanent total enclosure exists in the affected facility prior to the performance test and the Administrator is satisfied that the enclosure is totally capturing fugitive VOC emissions, then no additional total enclosure will be required for the performance test.

(iii) For each affected facility where the value of R is greater than or equal to the value of R_q calculated in § 60.443(b), compliance with § 60.442(a)(2) is demonstrated.

(iv) The performance of the solvent destruction device shall be determined by averaging the results of three runs as specified in § 60.8(f).

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

§ 60.445 Monitoring of operations and recordkeeping.

(a) The owner or operator of an affected facility subject to this subpart shall maintain a calendar month record of all coatings used and the results of the reference test method specified in § 60.446(a) or the manufacturer's formulation data used for determining the VOC content of those coatings.

(b) The owner or operator of an affected facility controlled by a solvent recovery device shall maintain a calendar month record of the amount of solvent applied in the coating at each affected facility.

(c) The owner or operator of an affected facility controled by a solvent recovery device shall install, calibrate, maintain, and operate a monitoring device for indicating the cumulative amount of solvent recovered by the device over a calendar month period. The monitoring device shall be accurate within ±2.0 percent. The owner or operator shall maintain a calendar month record of the amount of solvent recovered by the device.

(d) The owner or operator of a coating line operating at the conditions specified in § 60.442(b) shall maintain a daily and yearly record of the amount of solvent applied in the coating at the facility.

(e) The owner or operator of an affected facility controlled by a thermal incineration solvent destruction device shall install, calibrate, maintain, and operate a monitoring device which continuously indicates and records the temperature of the solvent destruction device's exhaust gases. The monitoring device shall have an accuracy of the greater of ±0.75 percent of the temperature being measured expressed in degrees Celsius or ±2.5°C.

(f) The owner or operator of an affected facility controlled by a catalytic incineration solvent destruction device shall install, calibrate, maintain, and operate a monitoring device which continuously indicates and records the gas temperature both upstream and downstream of the catalyst bed.

(g) The owner or operator of an affected facility controlled by a solvent destruction device which uses a hood or enclosure to capture fugitive VOC emissions shall install, calibrate, maintain, and operate a monitoring device which continuously indicates that the hood or enclosure is operating. No continuous monitor shall be required if the owner or operator can demonstrate that the hood or enclosure system is interlocked with the affected facility's oven recirculation air system.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

§ 60.446 Test methods and procedures.

(a) The VOC content per unit of coating solids applied and compliance with § 60.442(a)(1) shall be measured by either Reference Method 24 or manufacturers' formulation data. In the event of any inconsistency between a Method 24 test and manufacturers' formulation data, the Method 24 test will govern. The Administrator may require an owner or operator to perform Method 24 tests during such months as he deems appropriate.

(1) For Reference Method 24, the coating sample must be a one liter sample taken at a point which will be representative of the coating applied to the web substrate. The one liter sample is to be divided into three aliquots for triplicate analyses.

(b) Reference Method 25 shall be used to determine the VOC concentration, in parts per million by volume, of each effluent gas stream entering and exiting the solvent destruction device or its equivalent, and each effluent gas stream emitted directly to the atmosphere. Reference Methods 1, 2, 3, and 4 shall be used to determine the sampling location, volumetric flow rate, molecular weight, and moisture of all sampled gas streams. For Reference Method 25, the sampling time for each of three runs must be at least one hour. The minimum sampling volume must be 0.003 dscm except that shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the Administrator.

(c) If the owner or operator can demonstrate to the Administrator's satisfaction that testing of representative stacks yields results comparable to those that would be obtained by testing all stacks, the Administrator will approve testing of representative stacks on a case-by-case basis.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

§ 60.447 Reporting requirements.

(a) For all affected facilities, the performance test data from the initial performance test are submitted to the Administrator.

(b) The owner or operator of a coating line operated at the conditions specified in § 60.442(b) shall report the total amount of the solvent applied in the coating for each operating day. Every fourth quarter the yearly amount of solvent applied in the coating shall be reported.

(c) For affected facilities complying with § 60.442 without solvent recovery or solvent destruction devices the weighted average VOC content for each calendar month as specified in § 60.443(a)(2) shall be reported to the Administrator.

(d) For all affected facilities complying with § 60.442 by using a solvent recovery device, the following information shall be reported to the Administrator for each calendar month.

(1) The required overall emission reduction specified in § 60.443(b).

(2) The demonstrated overall emission reduction as specified in § 60.443(c).

(e) For all affected facilities complying with § 60.442 by using a solvent destruction device, the following information shall be reported to the Administrator for each calendar month.

(1) The required overall emission reduction specified in § 60.443(b).

(2) The overall emission reduction demonstrated during the most recent performance test which complied with § 60.442.

(3) All periods of temperature drop as defined under § 60.443(f).

(f) The owner or operator of an affected facility shall submit the written reports required under paragraphs (a) and (b) of this section to the Administrator for every calendar quarter. All quarterly reports shall be postmarked by the 30th day following the end of each calendar quarter.

(g) The owner or operator of an affected facility shall submit the written reports required under paragraphs (c), (d), and (e) of this section to the Administrator within ten days following the end of the calendar month being reported only if:

(1) The emissions limits of § 60.442 were exceeded during the calendar month; or

(2) Temperature drops as defined under § 60.443(f) occurred during the calendar month.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

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